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The International Magazine of Research and Development

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ABOUT THE COVER Chemist George Greene uses an atomic absorption spectrophotometer, typical of the instruments being shown at the Pittsburgh Conference. For more about new products at Pittcon, please turn to page 106. *Photo by Dana L. Duke, courtesy Perkin-Elmer Corp.*

R&D FOCUS

Don't Let Food Go To Waste: Make Plastic Out of It 52

Researchers are learning to turn potato starch into lactic acid, and then into a plastic. But can they do it cheaply?

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What Makes Beer Taste Great? 74

This GC/FTIR interface accessory allows you to determine the trace components in beers that contribute to their flavor and aroma.

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An ultrafast device based on the concept of systolic computing brings real-time parallel processing to reality.

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A chance meeting between U.S. and Japanese researchers results in a new process for making high-temperature superconducting circuits.

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A vacuum pump with large beds of getter materials provides high throughput for semiconductor and industrial processes.

R&D BUSINESS

Regional Distribution of Spending for University Research Is Changing

Researchers in universities along the Atlantic coast from Maryland to Florida received 12% more in real dollar funding in 1989 over what they received in 1988, according to a recent U.S. National Science Foundation study. This growth is nearly five percentage points higher than that of the next closest region and more than three times the spending increase of Pacific Coast universities.

In fact, 1989 was the sixth consecutive year that this area experienced double-digit growth in university R&D funding. No other region came close to this type of growth.

Nearly a quarter of the $2.7 billion spent on research in South Atlantic Coast states was performed at one place—Johns Hopkins Univ., Baltimore. The Applied Physics Laboratory at Johns Hopkins alone received $431 million in R&D funding, of which $422 was federally financed. But even excluding Johns Hopkins, the average increase from 1988 to 1989 is still 12%.

Part of the reason for this dramatic growth is historical. Outside of Maryland institutions, most South Atlantic universities have relatively new research programs. With the recent emphasis on attracting high-tech businesses with strong local university research programs, many states have made dramatic increases in their university research departments.

"We've only been in the research business for the past 20 years," says Demetrius Paris, vice president for research at Georgia Institute of Technology, Atlanta. "We've experienced tremendous growth since then and we're still growing."

Florida, one of the fastest growing states in the U.S., has significantly upgraded its research capabilities. Four Florida universities are listed in the NSF's top 100 institutions for receiving research funds. Univ. of South Florida, Tampa, for example, currently listed 80 on this list, increased its funding 51% from 1988 to 1989 and by more than 400% in the past three years. □

NIST Offers Foreign Standards Hotlines

Two telephone hotlines that provide the latest information on foreign technical standards, certification rules, and regulations are available for U.S. manufacturers and exporters from the U.S. Dept. of Commerce's National Institute of Standards and Technology, Gaithersburg, MD.

One hotline (301/921-4164) contains weekly updated information on draft European Community (EC) laws and standards that might create technical trade barriers for U.S. companies. The recording lists specific subject areas, products, deadlines, and sources for obtaining review copies of the standards and regulations.

Call 301/975-4041 for a weekly updated recording on proposed foreign regulations from the 83 member countries of the General Agreement on Tariffs and Trade. □

High-tech Exports Outpacing Imports

U.S. exports of advanced technology products, such as those in biotechnology, computer, and aerospace areas, exceeded imports of similar products by $25.5 billion in 1989, according to the U.S. Dept. of Commerce.

This is the third straight year in which trade surpluses have exceeded $20 billion in this category.

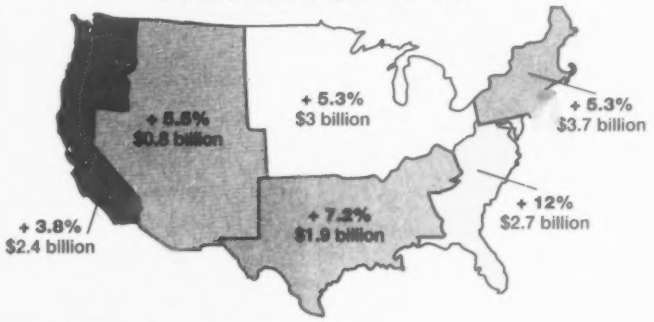
The large surplus is mostly the result of continuing U.S. dominance in aerospace products. Seattle-based

Steady Electrochemistry Instrument Growth

The market for instruments that measure the electrical characteristics of chemicals is forecast to grow nearly 12% annually to $609 million in 1993, according to Strategic Directions International, a Los Angeles-based management consulting firm.

This market includes pH and ion selective electrodes and meters, polarography/voltammetry instruments, and automatic titrators. The pH measurement systems make up more than 50% of the market.

More University Research Dollars Headed Southeast in 1989



* Percentage increases adjusted for inflation

Source: U.S. National Science Foundation

***R&D spending at universities** that grant a graduate science or engineering degree has increased at a higher level in Southeastern states than elsewhere in the U.S.*

R&D NEWS

Researchers Defy Drug Testing

While many U.S. companies are jumping on the drug-testing bandwagon, the majority of researchers who responded to *R&D Magazine's* October Drug Testing Poll say they never have been screened by their employers for the use of illegal drugs.

Of the 115 researchers who responded to the *R&D* poll, 74% say they have never been tested for drug use before or during their employment.

Only 43% agree that their employers should screen coworkers for illegal drug use. This contrasts sharply with a 1990 Gallup poll of 506 workers in Illinois, which is ranked among the worst states in the nation for reported on-the-job drug use. Nearly 70% of the Gallup respondents said their companies should adopt drug testing programs.

While 66% of *R&D's* respondents believe law enforcement officers, air traffic controllers, and health care professionals should submit to drug tests, 51% of the researchers say they are offended by such random testing in their own profession. Nearly half of these respondents argue that the practice violates employee civil rights.

"Drug testing is a bio-invasive procedure that, if implemented anywhere, will ultimately result in a loss of our freedoms everywhere," writes one researcher.

Some say they would look for employment elsewhere if asked to submit to drug tests.

"When I graduated with my bachelor's degree in December 1990, I went job hunting in the Chicago area and I landed an interview with a large health care company," writes one *R&D* respondent. "I was shocked to learn that before the interview, before even filling out an application, I was handed a form explaining their drug testing policies and asked to sign away my constitutional rights. I told the secretary I would not do that for any job.

"Evidently, my response surprised her because she immediately called for the head of the personnel department. I explained my position to her and she admitted that in all her 12 years of experience, no one had ever even issued a word of protest to the policy. Now it was my turn to be totally shocked!"

Still, 49 of the 115 *R&D* respondents advocate mandatory drug testing for research professionals and say they would be willing to sacrifice a bit of personal freedom to ensure that they were working in a drug-free laboratory.

"The overruling fact in this controversy is that safety, both public and personal, must win out over 'civil rights,'" writes one researcher in favor of drug testing.

Another offers a more sobering response: "I believed drug testing violated my civil rights—until I stopped using drugs!"

Some researchers said they felt their employers had an obligation to screen employees for illicit drug use. "I believe an employer should be able to test employees for drugs that alter their ability to work properly," says one university professor. "While my employment is not in a critical area, I would welcome employer-paid testing of our whole faculty to prove that the workplace is drug free."

Compared to workplaces of the Gallup poll respondents—nearly 40% say they have seen or heard of others using drugs on the job—the labs of *R&D* respondents seem to be relatively drug-free. Still, 23%—about one in four—say they know a coworker who uses illegal drugs.

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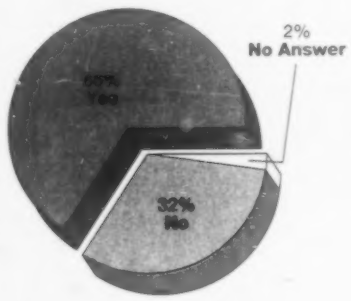
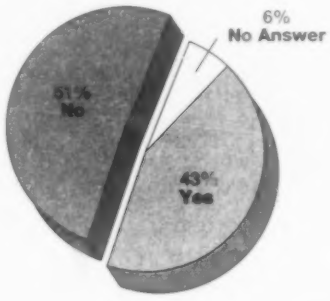
Life-Critical Jobs



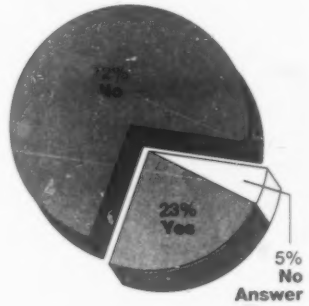
Should there be drug testing of pilots, police officers, physicians, and others in life-critical occupations?

Research Scientists



Should there be drug testing of research scientists?

In-Lab Drug Use



Do you know of any employee at your organization who uses illegal drugs?

Some researchers who report drug use in the laboratory say that the practice doesn't always compromise worker safety.

"I know of more than one [computer programmer] who is more creative ... when a little high," writes one respondent. "Drugs can turn mundane logic into unique and creative thinking."

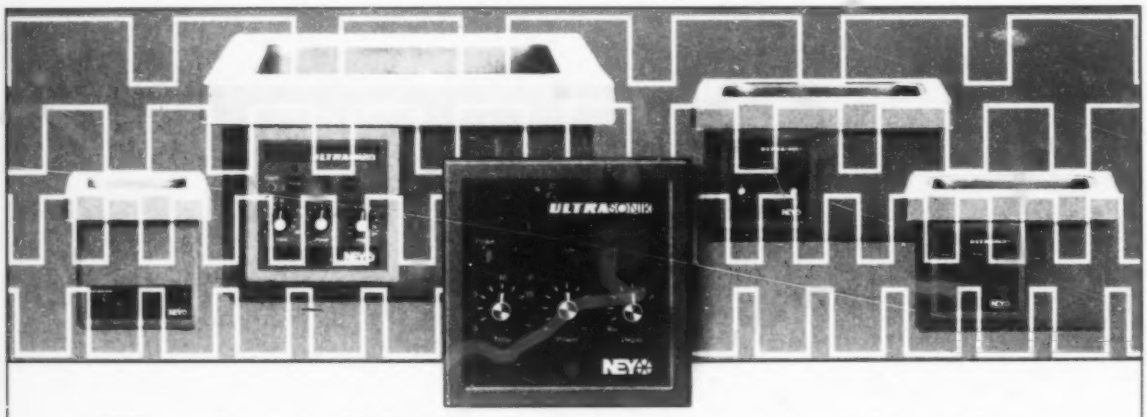
Those who have not witnessed drug use in their laboratories find even fewer reasons for their employers to implement drug testing programs.

"Drug testing in the workplace has become increasingly commonplace over the last few years, and it's long past time for some serious reflection," writes one scientist. "As researchers, we should all ask ourselves whether the state of scientific research has improved as a result of drug testing.

"As I examine the scientific literature in my daily work, I find no evidence that the quality or quantity of scientific research has increased during the last few years, as drug testing has become more prevalent.

"Our employers are not the police, and they should not be expected to act as such by the Federal government. If drug laws cannot be enforced by techniques that maintain the inalienable right to privacy of the individual in our society, then these laws should be repealed." □

News continues



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